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THE MAGAZINE FOR NETWORKING PROFESSIONALS

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**Provisioning Access  
to Network Assets  
Get a Jump Start**



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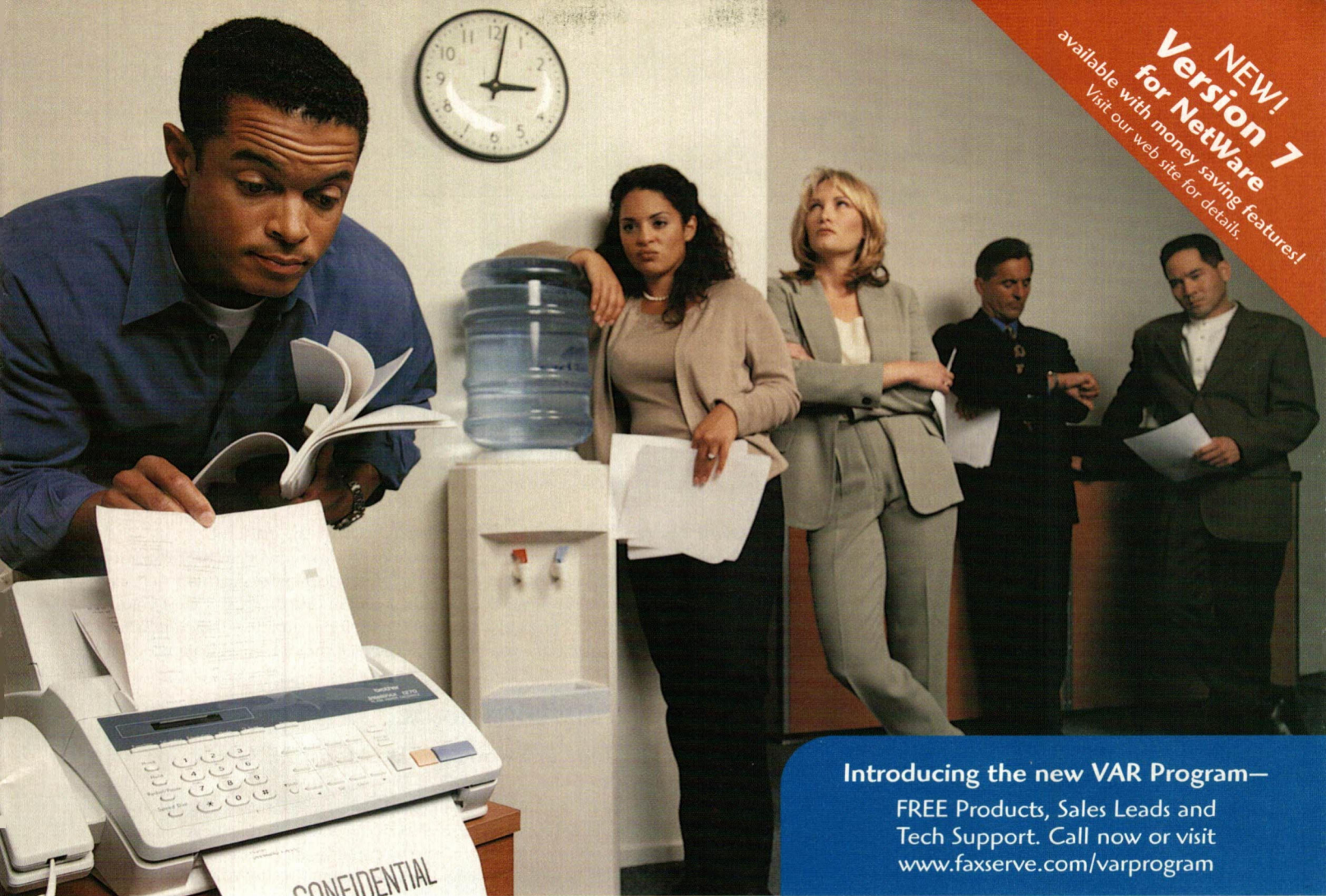
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## COVER STORY

Get a jump start on setting up your company's employee provisioning system with Novell Nsure Resources.

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Setting up and managing user accounts on multiple systems can become a tremendous drain on IT resources. An employee provisioning system could eliminate some of the management headache, but how do you set up such a system? Novell Nsure Resources can help you start the process of creating an employee provisioning system for your company.

### 20 Novell Nsure Resources: The Road From Lab to Live

After you set up Novell Nsure Resources in your lab, you can begin the process of creating a live employee provisioning system for your company. As this article explains, this process can be somewhat complicated. For one thing, you must completely understand your company's processes and systems and how they interact. Find out the other basic steps you must take to make the transition from your lab to a live network.

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Debi Pearson

#### Senior Technical Editor

Dennis Fredette

#### Senior Writer

Cheryl Walton

#### Associate Editor

Jeanne Quigley

#### Art Director

Debra Reynolds

#### Publisher

Ted Lloyd

#### Advertising Managers

Brian Smith, Central Sales,

1-801-465-4753

Steve Branda, Eastern and Northwestern Sales,

1-201-814-0500

Kaye Young, Southwestern Sales,

1-909-338-0050

#### Contributors

Brad Anderson

Edward Falzon

Linda Kennard

#### Cover

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## Letter to the Editor

I appreciate your magazine, especially the insight into some of the executives at Novell and the direction they're taking. However, the October issue has a bit of incorrect information. In the "Outgrown the ZENworks Starter Pack?" article, Ms. Marymee makes the statement, "Already, the Starter Pack does not support mobile users, Windows XP, or Windows 2000 desktops" (see p. 23). To the contrary, the ZENworks Starter Pack does support Windows 2000. In fact, when creating a new policy, the NetWare Administrator (NW-ADMIN) utility presents you with the options WinNT-Win2000 User Package and WinNT-Win2000 Workstation Package. This bit of incorrect information could mean the difference between someone using the Starter Pack or not using ZENworks at all. Just wanted to let you know.

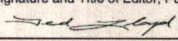
Thanks,  
ajr

Thanks for your letter. The clarification is that the ZENworks Starter Pack treats Windows 2000 Professional just as it treats Windows NT 4. In other words, ZENworks Starter Pack does not support the management features available in Windows 2000 Professional—features such as the group policy, Microsoft installer, and IntelliMirror integration. The ZENworks Starter Pack was designed for Windows 95 and Windows NT 4.

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## A Rose by Any Other Name

In the October issue of *Novell Connection*, Debra Bergevine, Chief Marketing Officer (CMO) at Novell, previewed Novell's marketing plans, giving readers a behind-the-scenes look at a new marketing campaign that would be rolled out later this fall. (See "Debra Bergevine: Meet Novell's CMO," pp. 4-6.) Specifically, Bergevine explained that Novell would focus on four key capabilities: Novell exteNd, Novell Nsure, Novell Npower, and Novell Ngage.

Novell has begun to roll out the campaign on schedule, beginning with a press release on October 9. (See "Novell Gets Focused, Delivers One Net Solutions for a World Without Information Boundaries" at [www.novell.com/news/press/archive/2002/10/pr02067.html](http://www.novell.com/news/press/archive/2002/10/pr02067.html).) At the same time, Novell contacted *Novell Connection* to tell us that one of the terms Bergevine had used to explain a key capability had been changed. Rather than using Novell Npower, Novell is using the term *Novell Nterprise*. Because *Novell Connection* readers were given a preview of Novell's marketing plans, Bergevine used the terms Novell was using internally. Before making a public announcement, however, Novell changed Npower to Nterprise.

Going forward, Novell will refer to its four key capabilities as follows:

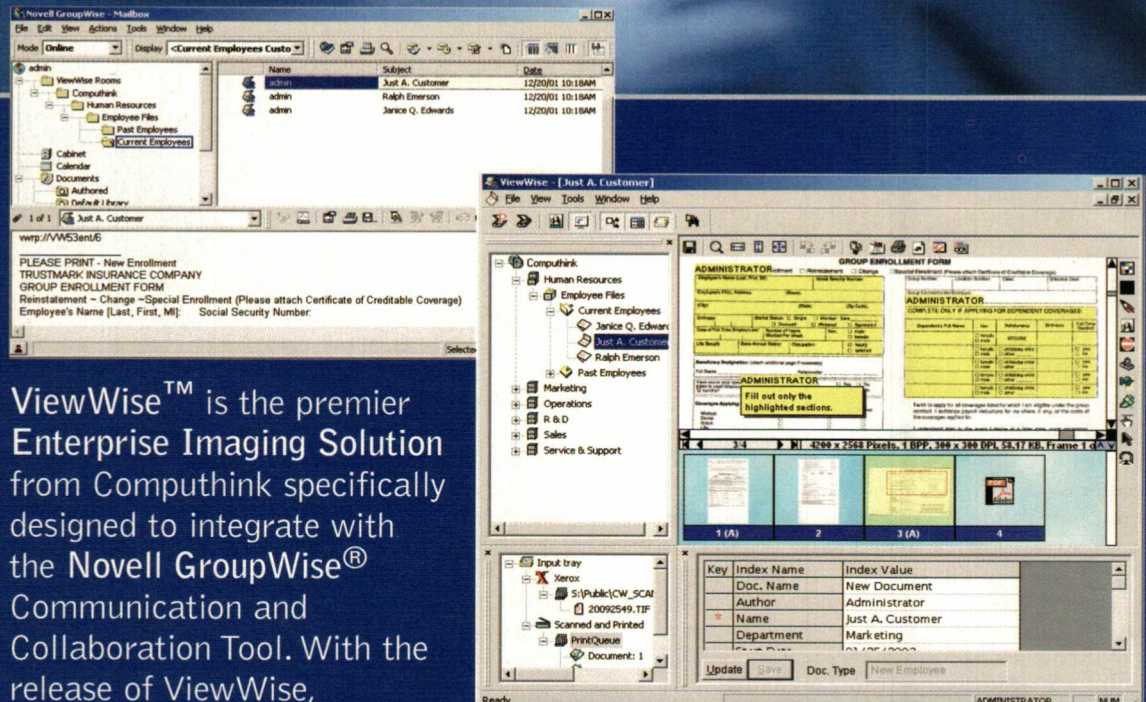
- Novell exteNd helps companies rapidly build advanced web applications that leverage existing systems to deliver relevant services to key business constituents.
- Novell Nsure delivers secure identity management so businesses can reach out to the right people yet keep their systems secure.
- Novell Nterprise provides secure, scalable, and reliable cross-platform networking services, giving customers freedom of choice and helping them profit from existing investments more effectively.
- Novell Ngage provides the business and technical expertise to deploy solutions in these three areas.

For more information about these key capabilities, visit [www.novell.com](http://www.novell.com).





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# Provisioning Access to Network Assets

by Linda Kennard

Get a Jump Start With  
Novell Nsure Resources

**t**oday a new receptionist, on an apparent caffeine high, blasts you with way too much cheer as you make your way through the door. You don't know why this receptionist replaced the last one, who sat bored at the front desk for only five gum-filled days. You know only that the termination and new hire will cost you and others in the IT department time and, consequently, cost your company money.

Admittedly, adding and disabling user accounts on multiple systems for a single hire and subsequent hire doesn't consume that much time or money, but these minutes and cents add up over a year. The minutes and cents add up even more quickly when you factor in the time and money spent moving and changing user identity information on multiple systems. Think about it: How much time do you and your IT coworkers spend setting up accounts for new hires and moving, adding, changing, or tearing down existing accounts?

Specific answers to this question naturally vary between companies. In one estimate, however, Novell suggests that in a company of 3,000 employees, each of ten IT workers over the course of one year probably spends 40 percent of his or her time managing user-identity information. This time estimate equates to a projected annual cost of U.S. \$399,360.

If you've given this topic an ounce of thought, you don't need this estimate or any other estimate to draw this conclusion: A system that automates the processes of creating, modifying, and deleting user-identity information could save your company a lot of money. After all, such a system requires you to enter and manage user identity information only once in one system, rather than several times in several systems. Equally (if not more) important, such a system decreases the amount of time it takes to provide or provision access to network resources and thus increases productivity. Hence, this type of system is commonly called an *employee provisioning system*.

Burton Group analyst Kevin Kampman confirms your suspicions that provisioning



systems provide "legitimate opportunities for return on investment [ROI] in the short term." (Burton Group is an IT research, consulting, and advisory firm. For more information, visit [www.burtongroup.com](http://www.burtongroup.com).) In fact, Kampman says, short-term benefits are only the most tangible benefits of provisioning systems, which offer arguably more significant long-term benefits. (For more information, see "In the Long Run" on p. 19.)

If provisioning systems offer quantifiable short-term ROIs (not to mention less quantifiable but equally real long-term benefits), why hasn't your company implemented one? Novell believes that at least one reason you haven't started setting up a provisioning system is that you just don't know where to start. Enter Novell Nsure Resources, one of several products in Novell's secure identity management (SIM) solution.

Released in October, Nsure Resources shows you where and how to start. Nsure Resources jump-starts the process of implementing a system that enables you to quickly provision access to the resources users need to be productive. This system is hereafter called a *provisioning system*.

## Did You Know?

DirXML is the only metadirectory product currently in Gartner's Metadirectory Service Market Magic Quadrant. The Metadirectory Service Market Magic Quadrant is a measure of several factors that determine a metadirectory product's viability in the marketplace. (See "2HO2 Metadirectory Service Market Magic Quadrant," *Gartner Research Note*, Markets, Aug. 19, 2002. This Research Note is available at [www.gartner.com/reprints/novell/109261.html](http://www.gartner.com/reprints/novell/109261.html).)

## THE QUICK PATH TO PROOF OF CONCEPT

Nsure Resources provides you with a generic design for a provisioning system that is based on an equally generic set of business policies. You can get this simple infrastructure up and running in a lab within only a few short days. In fact, enabling you to set up and test a generic provisioning system quickly and easily in a lab is Nsure Resources' reason for being.

To develop Nsure Resources, Novell compiled information from customers who had already implemented provisioning systems. Based on this information, Novell tailored key DirXML 1.1a components to represent what





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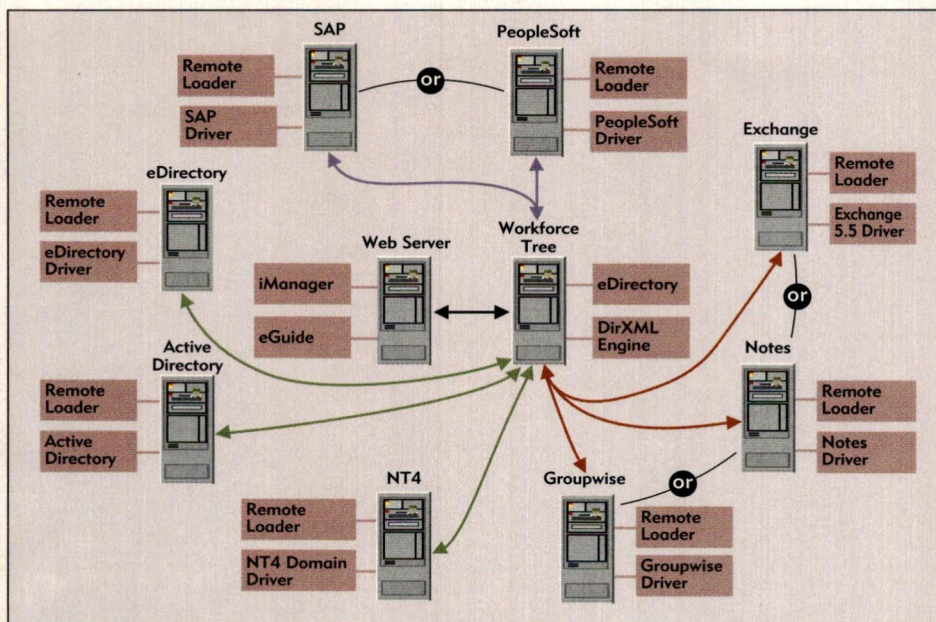


**Figure 1.** When you set up Nsure Resources in your lab, the configuration of the employee provisioning system you create will resemble the configuration shown here.

amounts to the common denominator among these companies' varied configurations. (For more information about DirXML, see "The DirXML Basics" on p. 16.)

The heart and soul of Nsure Resources, DirXML is Novell's data-sharing software that enables bidirectional real-time exchange of information between network applications, directories, and databases. (For an interesting tidbit about DirXML, see "Did You Know?" on p. 6.) As the name suggests, DirXML, and consequently Nsure Resources, is based on eXtensible

Markup Language (XML) and eXtensible Style Sheet Language Transformation (XSLT). As is typical of Novell software, DirXML and Nsure Resources run on several different platforms, including Windows 2000 and NT, Solaris, Linux, and NetWare.

To offer you this ready-made, common-denominator starting point, Novell engineers created configuration files for you to import into a set of DirXML drivers. (For information about other DirXML drivers that Nsure Resources

does not include, see "The Other DirXML Drivers" on p. 18.)

With these files, Nsure Resources offers preconfigured DirXML drivers for the following human resource, messaging, and account systems:

- PeopleSoft (PeopleTools 7.5x and 8.1x)
- SAP HR 4.6c or above
- Microsoft Exchange 5.5
- Microsoft Exchange 2000
- Novell GroupWise versions 5.5, 6.0, and 6.1

- Lotus Notes R5
- Novell eDirectory 8.62 and 8.7
- Microsoft Active Directory
- Microsoft NT 4

For your initial Nsure Resources setup, you choose a set of drivers for only a few of these systems. Specifically, Nsure Resources enables you to choose drivers for the following number of systems:

- One human resource application (either PeopleSoft or SAP)
- One messaging application (either GroupWise, Lotus Notes, or Exchange)
- One or all three of the account and NOS directories (eDirectory, Active Directory, or NT 4)

After you set up Nsure Resources in your lab, you can observe what this product enables by default: the automatic creation, modification, and deletion of user accounts instantly, with a single action, across the systems you include in your setup. The order in which these events occur on these systems, the types of events that occur on each system, and the way these events occur are all based on Nsure Resources' preconfigured design.

The bottom line is that within only days, you can set up Nsure Resources in your lab and begin immediately to observe and test a generic provisioning system. This system can then serve as the launch pad to a customized system suitable for your live network.

## THE READER'S DIGEST GUIDE TO GETTING NSURE RESOURCES GOING

Getting Nsure Resources going in the lab is relatively simple, and when you've done so, the configuration you create will resemble the configuration shown in Figure 1. Detailed instructions for getting Nsure Resources to this point are beyond the scope of this article. (For detailed instructions, see the Nsure Resources deployment guide, which will be made available on the Nsure Resources home page at [www.novell.com/products/nsureresources](http://www.novell.com/products/nsureresources).) However, a general discussion of the installation steps will help you get the gist of what setting up Nsure Resources entails:

1. Install and make available the human resource, messaging, and account systems you will include in your lab setup.
2. Install eDirectory, and create a provi-

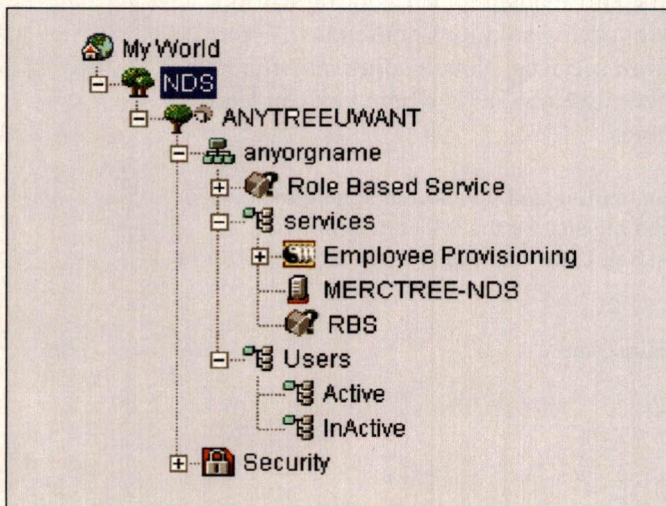


**Figure 2.** The Workforce Tree (shown here) has a flat structure and includes little more than containers for users and provisioning services objects.



- sioning tree.
3. Install DirXML components.
  4. Install Novell iManager and Novell eGuide.
  5. Import the preconfigured drivers for the systems you want to include in your Nsure Resources setup.

### Setting Up Application Systems

Before you install Nsure Resources, you need to set up and configure the systems you plan to include in your lab setup. As Figure 1 shows, your initial setup may include the following:

- PeopleSoft or SAP
- Lotus Notes, Exchange, or GroupWise
- eDirectory and/or Active Directory and/or NT4

As part of this process, Nsure Resources documentation asks you to gather certain information about these applications. (Ultimately, DirXML drivers use this information to access the applications.) For example, the documentation asks you to note the user ID, password, and IP address that the Nsure Resources driver can use to access an application.

Later in the Nsure Resources setup process (when you import the driver configuration files), a wizard prompts you to enter this information. (See "The Install Wizards" section on p. 11.)

### Creating a Provisioning Tree

Before you install Nsure Resources, you also need to install eDirectory 8.6.2 or above (on a Windows 2000 or NT, Solaris, Linux, or NetWare server) and create a provisioning tree, which Novell calls the *Workforce Tree*.

As Figure 1 shows, the Workforce Tree is the conceptual hub of your Nsure Resources setup. This Workforce Tree acts as a central data repository (something you commonly find in DirXML environments). All of the other systems you include in your Nsure Resources configuration either publish information to or receive information from the Workforce Tree (via the DirXML engine) over their preconfigured drivers' Publisher Channel or Subscriber Channel, respectively.

The Workforce Tree has a flat structure and includes little more than containers for users and provisioning services. (See Figure 2.) For example, a Services container (created automatically)

## Attributes to Success

The following tables identify the User object attributes that Novell Nsure Resources' preconfigured drivers receive from and publish to the Workforce Tree by default. Drivers receive information from the Workforce Tree via their Subscriber Channel and publish information to the Workforce Tree over their Publisher Channel.

### LOTUS NOTES

#### Subscriber Channel Attributes

CN (common name)  
Description  
Surname  
Given Name  
Initials  
Title  
SA (Street Address)  
Postal Code  
OU (Organizational Unit)  
Telephone Number  
Generational Qualifier  
NSCP: employeeNumber  
L (Location)  
Facsimile Telephone Number

#### Publisher Channel Attributes

Preferred Name

### MICROSOFT ACTIVE DIRECTORY

#### Subscriber Channel Attributes

CN  
Internet E-mail Address  
Description  
Surname  
Given Name  
Initials  
WorkforceID

#### Subscriber Channel Attributes

Derived From Style Sheets  
Manager  
Full Name  
Login Disabled

### MICROSOFT ACTIVE DIRECTORY WITH EXCHANGE 2000

#### Subscriber Channel Attributes

CN  
Description  
Surname  
Given Name  
Initials  
WorkforceID  
Title  
SA  
Physical Delivery  
Office Name  
S (State)  
Postal Code  
OU  
Telephone Number  
Mobile  
Pager  
Home Phone

#### Subscriber Channel Attributes

Derived From Style Sheets  
Manager  
Full Name  
Login Disabled

#### Publisher Channel Attributes

Mail

continued on page 10



continued from page 9

## MICROSOFT EXCHANGE 5.5

### Subscriber Channel Attributes

CN  
Description  
Surname  
Given Name  
IS Manager  
Title  
Mailstop  
SA  
Physical Delivery Office Name  
S  
Postal Code  
OU  
Telephone Number  
Preferred Name

### Publisher Channel Attributes

Internet E-mail Address

## MICROSOFT NT DOMAIN

### Subscriber Channel Attributes

CN  
Description  
Full Name

### Subscriber Channel Attributes Derived From Style Sheets

Login Disabled

### Publisher Channel Attributes

Preferred Name

## NOVELL EDIRECTORY

### Subscriber Channel User Attributes

CN  
Internet E-mail Address  
Description  
Surname  
Given Name  
Initials  
WorkforceID  
ManagerWorkforceID  
IS Manager  
Title  
Mailstop  
SA  
Physical Delivery Office Name  
S  
Postal Code  
OU  
Telephone Number  
Full Name  
Employee Status  
Mobile  
Pager  
Home Phone

### Subscriber Channel User Attributes Derived From Style Sheets

DN (distinguished name)  
Manager  
Direct Reports  
Login Disabled

stores DirXML Driver objects, among other things, within an Nsure Resources container.

The Users container (created automatically during the driver import process) contains Active and Inactive containers. By default, Nsure Resources creates new User objects in the Active container. In the Inactive User container and also by default, Nsure Resources places User objects that represent users whose accounts have been disabled.

## Install DirXML Components

On the server running the Workforce Tree, you need to install the DirXML engine. The DirXML engine brokers the exchange of data between the Workforce Tree and the human resource, messaging, and account systems that you include in your Nsure Resources setup.

After the Workforce Tree is equipped with the DirXML engine, you begin the process of enabling your human resource, messaging, and account systems to publish information to or to receive information from this tree. Among other steps, this process involves installing and configuring the DirXML Remote Loader Service on the human resource, messaging, and account system servers that you configure to participate in the Nsure Resources setup.

First introduced in DirXML 1.1, the DirXML Remote Loader Service is software that enables communications between the DirXML engine and a DirXML driver running on another computer. Before Novell introduced the DirXML Remote Loader Service, you had to run the DirXML engine, your company's eDirectory tree, your client application (for example, PeopleSoft client), and the application's DirXML driver on the same server. As you can see in Figure 1, with the Remote Loader Service, you can run the DirXML engine and eDirectory tree on one server, and you can run the application and its DirXML driver on a another server. (See p. 8.)

## Install Novell eGuide and iManager

To complete the process of installing Nsure Resources' prerequisite software, you need to install Novell eGuide and Novell iManager on a web server.

Novell eGuide is a white-pages application that enables users to conduct browser-based searches for the e-mail

continued on page 12



addresses, fax numbers, telephone numbers, and names of other users in your company. (For more information about eGuide, consult Novell online documentation, which you can download from [www.novell.com/documentation/lg/eguide21](http://www.novell.com/documentation/lg/eguide21).) Users can also use Novell eGuide to update the details of their own identity information, an ability you enable via Novell iManager.

Novell iManager is Novell's new management interface that enables you to use a browser and, in some cases, a handheld device to manage your company's eDirectory tree. For example, using Novell iManager, you can manage your Workforce Tree over wired and wireless connections to an intranet, an extranet, or the Internet.

Perhaps more exciting, Novell iManager enables role-based (or delegated) administration. As a result, you can farm out specific sets of administrative tasks—in this case, tasks related to user identity management—to particular users. These users, in turn, can access the Workforce Tree to complete these tasks, and they don't need a thorough understanding of the directory to do so.

Most important in this context, DirXML 1.1a plug-ins for Novell iManager enable you to remotely manage all aspects of your DirXML system, or, in this case, your Nsure Resources system. (The DirXML 1.1a plug-ins are included with Nsure Resources.) For example, using Novell iManager, you can find and view Nsure Resources' preconfigured DirXML drivers and can add, activate, and delete DirXML drivers.

You install the Novell eGuide and Novell iManager program files on a web server. If you don't already have a web server, the installation program for these applications enables you to install either Apache 1.3.20 or Tomcat 3.2.3. (For more information about these web server platforms, see <http://httpd.apache.org> and <http://jakarta.apache.org>.)

### The Install Wizards

After you install Nsure Resources' prerequisite software, you will need to set up Nsure Resources. To do so, you launch Novell iManager, authenticate to the Workforce Tree, and select one of Nsure Resources' installation wizards from DirXML Management. (See Figure 3.)

For example, the Install Drivers wizard enables you to import preconfigured DirXML drivers for one human resource

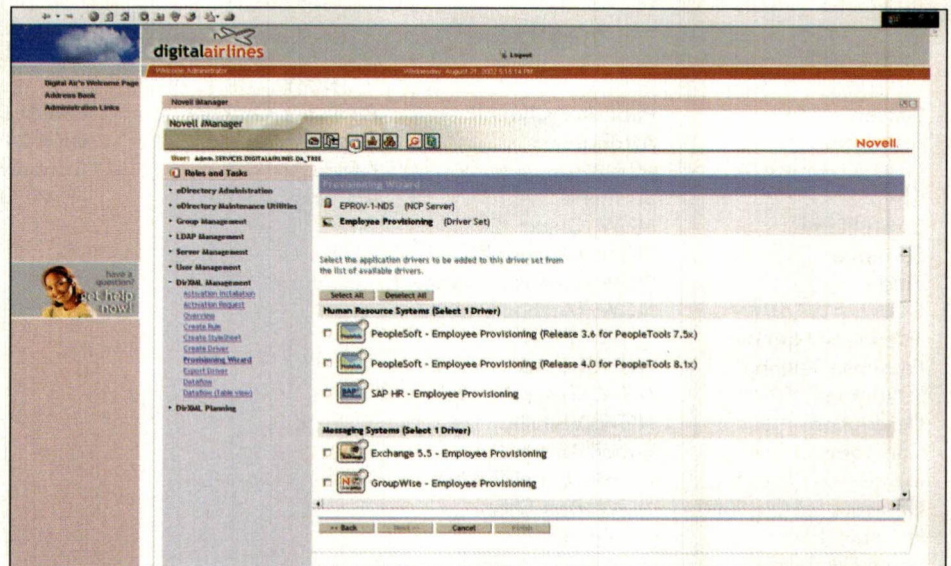


**Figure 3.** Using the Install Drivers wizard, you click to select the DirXML drivers for the human resource, messaging, and account applications you choose to include in your company's Nsure Resources setup. (This screen shot is taken from a prerelease version of Novell Nsure Resources. The shipping version may include some changes. The Install Drivers wizard provides the same function and similar screens as the Provisioning Wizard shown here.)

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| NOVELL GROUPWISE              |                              |                                                    |                                                 |                                                     |
|-------------------------------|------------------------------|----------------------------------------------------|-------------------------------------------------|-----------------------------------------------------|
| Subscriber Channel Attributes | Publisher Channel Attributes | Publisher Channel GroupWise Post Office Attributes | Publisher Channel GroupWise Resource Attributes | Publisher Channel GroupWise Distribution Attributes |
| CN                            | Surname                      | Member                                             | NGW: Owner                                      | Member                                              |
| Given Name                    | NGW: Object ID               |                                                    |                                                 | NGW: Blind Copy                                     |
| Surname                       | NGW: Account ID              |                                                    |                                                 | Member                                              |
| Title                         | NGW: Gateway Access          |                                                    |                                                 | NGW: Carbon Copy                                    |
| OU                            | NGW: Mailbox Expiration Time |                                                    |                                                 | Member                                              |
| Telephone Number              | NGW: File ID                 |                                                    |                                                 |                                                     |
| Facsimile Telephone Number    | NGW: GroupWise ID            |                                                    |                                                 |                                                     |
| Description                   | NGW: Visibility              |                                                    |                                                 |                                                     |
| Company                       | E-mail Address               |                                                    |                                                 |                                                     |
| Initials                      | Internet E-mail Address      |                                                    |                                                 |                                                     |
| Generational Qualifier        | NGW: Post Office             |                                                    |                                                 |                                                     |
| Personal Title                |                              |                                                    |                                                 |                                                     |
| Login Disabled                |                              |                                                    |                                                 |                                                     |
| Login Expiration Time         |                              |                                                    |                                                 |                                                     |
| NGW: GroupWise ID             |                              |                                                    |                                                 |                                                     |

| PEOPLESOFT                    |                              |                                                        |
|-------------------------------|------------------------------|--------------------------------------------------------|
| Subscriber Channel Attributes | Publisher Channel Attributes | Publisher Channel Attributes Derived From Style Sheets |
| User ID                       | User ID                      | Full Name                                              |
| User DN                       | Last Name                    |                                                        |
| E-mail ID                     | First Name                   |                                                        |
| Description                   | Middle Name                  |                                                        |
| Cellular Phone                | Assoc ID                     |                                                        |
| Pager                         | Manager ID                   |                                                        |
| Home Phone                    | Manager                      |                                                        |
|                               | Job Code Descr               |                                                        |
|                               | Mail Drop                    |                                                        |
|                               | Address                      |                                                        |
|                               | City                         |                                                        |
|                               | State                        |                                                        |
|                               | Postal                       |                                                        |
|                               | Department Descr             |                                                        |
|                               | Business Phone               |                                                        |
|                               | Empl Status                  |                                                        |
|                               | Cellular Phone               |                                                        |
|                               | Pager                        |                                                        |
|                               | Home Phone                   |                                                        |

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application, one messaging application, and one to all three of the available account or NOS directories. Click to select the drivers you want to import. (See Figure 3 on p. 11.)

The Driver objects that represent these preconfigured drivers store other objects. These other objects represent rules and filters that together comprise the business logic underlying Nsure Resources' default policies and processes for managing user identities.

As a DirXML-based product, Nsure Resources applies rules to the information it receives to process this information. These rules are in either XML or XSLT format and define processes for a number of things. For example, schema-mapping rules map eDirectory object classes and attributes to other systems' object classes and attributes. Matching rules identify matches between specific objects in eDirectory and other systems. Other rules define the creation and placement processes.

As its DirXML core requires, Nsure Resources also includes rules that define how the DirXML engine must transform particular events or data before passing the information along to the receiving system. For example, a transformation rule might dictate that the DirXML engine should convert a "move to the Inactive container" event in the Workforce Tree to a "disable" event in Active Directory. Another transformation rule might specify that a birth date written



according to month, day, year (for example, 060873) in eDirectory should be converted to a day, month, year format (that is, 080673) before passing it to another system that uses the latter format.

Filters are XML documents that dictate what information can pass between the Workforce Tree and the other systems over a driver's Publisher or Subscriber Channel. Using filters, you can control which systems are the authoritative sources for various user account attributes. For example, filters on the PeopleSoft Publisher Channel ensure that changes to most user account attributes (including Last Name, First Name, Middle Name, Manager, and Address) flow from PeopleSoft to the Workforce Tree.

Filters on the Subscriber Channel allow information for far fewer attributes to travel from the Workforce Tree to PeopleSoft or SAP, ensuring that the human resource application remains the authoritative source for most user identity information. However, the Subscriber Channel filters do allow information for some attributes to flow in this direction, including information for cellular phone, pager, and home phone attributes. (For more information about the attributes that Nsure Resources preconfigured drivers receive, see "Attributes to Success" on p. 9.)

DirXML consults the rules and filters objects associated with a driver's Publisher Channel or its Subscriber Channel to determine such things as how to create and disable user accounts, which modified user information to synchronize across which systems in your Nsure Resources setup, and how to format information to suit the system receiving the information.

After you select drivers for the systems you want to include in your Nsure Resources lab setup, another installation wizard (not yet definitively named when this article was written) prompts you to enter information about these applications. For example, for each application, you enter the IP address and port number as well as the user ID and password that Nsure Resources should use to access this application. The wizard then uses this information to finish configuring each of the drivers.

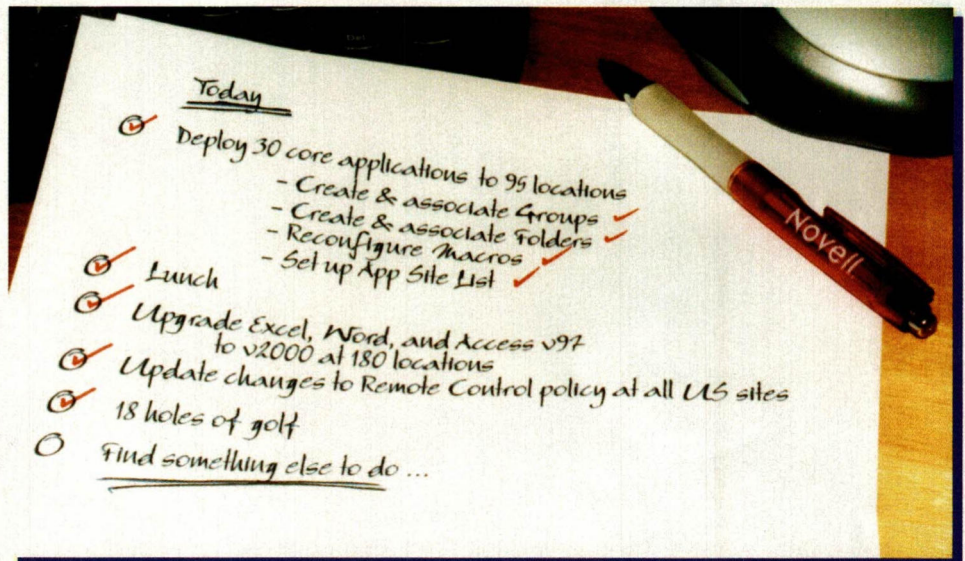
That, in the proverbial nutshell, is the gist of the Nsure Resources setup process.

## POLICIES IN ACTION

After you set up Nsure Resources, you can begin immediately to test your lab setup to ensure that it is working properly and to observe what Nsure Resources can do by default. What Nsure Resources does is governed by its default policies for managing user-identity information—the logic for which is stored in the rules and filters objects contained in the Driver objects.

Specific policies vary, depending on which systems you're using. In general terms, however, Nsure Resources default policies include the following:

- The human resource system (that is, either PeopleSoft or SAP) is the authoritative source for most user identity information, including employee name, department, location, and title.



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A close-up photograph of a human fingertip, showing the intricate ridges of a fingerprint. The fingertip is positioned diagonally across the frame, with the tip pointing towards the upper right. The skin is a warm, reddish-brown color. Projected onto the central part of the fingerprint is the text "ACCESS GRANTED" in a bright yellow, pixelated, digital font. The text is arranged in two lines: "ACCESS" on the top line and "GRANTED" on the bottom line. The background is a deep blue sky with soft, wispy white clouds, visible on the right side of the image. The lighting is dramatic, highlighting the texture of the fingerprint and the glowing effect of the projected text.

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## The DirXML Basics

DirXML 1.1a is the foundation for Novell Nsure Resources, a system that helps to automatically provision access to network resources. Consequently, understanding the DirXML basics will help you better understand Nsure Resources. (For more information about DirXML, see the following *Novell Connection* articles: "Too Many Directories? Synch 'Em With DirXML," May 2000, 8-14; "Check Out That DirXML Engine," May 2000, pp. 16-19; "DirXML 1.1: Synching With Style," Oct. 2001, pp. 40-41. You can download these articles from [www.ncmag.com/past](http://www.ncmag.com/past).)

DirXML uses the following products and components:

- **Novell eDirectory 8.7.** DirXML 1.1a uses Novell eDirectory 8.7 as a central repository for directory-based information, such as user-identity and DirXML configuration information.
- **DirXML Drivers.** DirXML drivers are application-specific and consist of three main components:
  - **An Application's Application Program Interface (API).** The application API component enables the driver to communicate with and make changes in an application.
  - **An Application Shim.** The application shim uses the application API to push information (via the DirXML engine) in two ways: from the application to eDirectory over a driver's Publisher Channel or from eDirectory to the application over a driver's Subscriber Channel.
  - **Driver Parameters and Policies.** A driver includes a collection of eXtensible Markup Language (XML) and eXtensible Style Sheet Language Transformation (XSLT) documents comprised of rules, filters, and other parameters that together determine the scope and nature of information exchanges between an

application and eDirectory. These rules and filters are stored as objects within Driver objects in your eDirectory tree and are associated with a driver's Publisher Channel, Subscriber Channel, or both channels. (Data transformations describe how data are transformed from one representation to another. For example, a data transformation can describe how a date that is represented as 11-11-02 is transformed so that it is represented as November 11, 2002. Data transformations are described in XSLT style sheets.)

- **DirXML Engine.** The DirXML engine processes outbound information from eDirectory (bound for another application) and inbound information from another application (bound for eDirectory).

The DirXML engine subscribes to the eDirectory event system. When changes occur in eDirectory, the DirXML engine uses XML to create a DOM that describes these changes. The DirXML engine then processes these changes according to the rules and filters associated with drivers' Subscriber Channels. The DirXML engine hands these changes to the DirXML drivers, which push the information through to their respective applications.

After receiving application changes from a DirXML driver, the DirXML engine processes these changes according to the rules and filters associated with this driver's Publisher Channel. The DirXML engine then pushes these changes to eDirectory.

- **DirXML Remote Loader Service.** The DirXML Remote Loader Service is agent software that enables the DirXML engine to communicate with a DirXML application API and shim running on a remote computer. That is, the Remote Loader enables you to run an application's API and the application shim component of a DirXML driver on one computer and to run the DirXML engine and eDirectory on another computer. ●

This means, among other things, that when a new user is entered into the human resource system, DirXML will instantly create new user accounts across the other systems in the Nsure Resources setup, including the Workforce Tree and the messaging system.

- The messaging system (that is, Lotus Notes, Exchange, or GroupWise) is the authoritative source for messaging-related information, such as e-mail address and post office domains. This means, among other things, that when the messaging system creates an e-mail account for a new user, DirXML instantly distributes relevant information to the other systems in the Nsure Resources setup, including the Workforce Tree and the human resource system.
- The Workforce Tree is an additional authoritative source for users' cell phone, home phone, and pager numbers, which users update using Novell eGuide.
- Nsure Resources' naming policy adjoins the first initial in a user's first name to the user's surname. (For example, Linda

Kennard becomes lkennard.) If this concatenated name exists, Nsure Resources affixes a number (1, 2, and so on) to the end of the name. (For example, a second lkennard becomes lkennard1.)

- Nsure Resources' policy for dealing with terminated employees' accounts in the Workforce Tree is to inactivate these accounts, rather than delete them. That is, when an employee is terminated and, as a result, this employee's account is disabled in the human resource system, Nsure Resources moves the User object representing this employee in the Workforce Tree from the Active container to the Inactive container. When an account is disabled (in the human resource system) and moved to the Inactive container in the Workforce Tree, Nsure Resources disables corresponding accounts in the other systems (such as GroupWise and Active Directory) that are tied to your identity-management system.

As you can guess, these policies represent only a small sampling of the default

policies governing Nsure Resources processes for managing user-identity information. This sampling, however, should give you an idea of the types of policies underlying Nsure Resources' processes for creating and inactivating user accounts as well as synchronizing modified information within these accounts.

To give you a better idea of how these default policies play out when Nsure Resources is in action, suppose that you have successfully installed and configured Nsure Resources in your lab. Further suppose that in this lab setup, you included the following systems: PeopleSoft, Exchange 5.5, eDirectory (the Workforce Tree), and Active Directory. This example assumes that you have prepared all of these systems for participation in your Nsure Resources setup according to Novell's documentation for Nsure Resources.

### Creating New Accounts

When you enter a new username, such as Linda Kennard, in PeopleSoft, the PeopleSoft system records this event



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| Subscriber Channel Attributes                                                                                     | Publisher Channel Attributes                                                                                                                                                                       | SAP<br>Publisher Channel Attributes<br>Derived From Style Sheets                                                        | Publisher Channel Group<br>Attributes Derived From<br>Style Sheets |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| PO105:USRID:MAIL:78:30<br>Description<br>PO105:USRID:CELL:78:30<br>PO105:USRID:PAGR:78:30<br>PO006:TELNR:1:195:14 | Surname<br>Given Name<br>Initials<br>WorkforceID<br>Title<br>SA<br>Physical Delivery Office Name<br>S<br>Postal Code<br>OU<br>Telephone Number<br>Employee Status<br>Mobile<br>Pager<br>Home Phone | CN<br>Manager WorkforceID<br>Manager<br>Direct Reports<br>IS Manager<br>Full Name<br>Login Disabled<br>Group Membership | Member                                                             |

in a transaction table. The PeopleSoft driver's Publisher Channel periodically accesses this transaction table by way of Component Interface (CI) objects, which are part of Novell's PeopleSoft Service Agent (PSA).

The PSA you install and extract when you install the preconfigured PeopleSoft driver is a collection of software processes and components that run on your PeopleSoft database server. The PSA defines what data and how data will be available from PeopleSoft for synchronization with your eDirectory Workforce Tree.

Based on the information found in the transaction table, the PeopleSoft driver then constructs an XML document and passes this document to the DirXML engine for processing.

To process this new XML document, the DirXML engine consults the rules associated with the PeopleSoft driver's Publisher Channel. For example, the DirXML engine consults the driver's Matching rules to ensure that this user does not already exist in the Workforce Tree.

The DirXML engine also consults the Create rule, which dictates, among other things, the attributes the engine needs information about before it can create a User object. The Create rule also dictates the naming policy the DirXML engine should use to name this User object.

In addition, the DirXML engine consults the Placement rule, which ensures that this new User object is placed in the

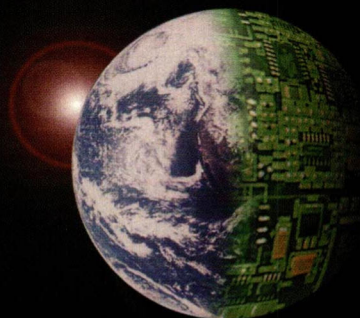
Active container within the Users container. In the end, a new Ikennard User object is created.

#### Updating Account Information

The creation of the Ikennard object in the Workforce Tree triggers the creation of

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## The Other DirXML Drivers

Nsure Resources includes several preconfigured Novell DirXML 1.1a components, including configuration files for DirXML drivers for popular human resource, messaging, and account and NOS systems. Following is a summary of DirXML drivers for which Nsure Resources does not provide configuration files. (For more information, visit [www.novell.com/products/edirectory/dirxml/drivers](http://www.novell.com/products/edirectory/dirxml/drivers). For DirXML 1.1a pricing, visit [www.novell.com/products/edirectory/dirxml/pricing.html](http://www.novell.com/products/edirectory/dirxml/pricing.html).)

- **DirXML Driver 2.2a for Active Directory.** You can configure this DirXML driver to synchronize information contained in Active Directory lists with information in Novell eDirectory User and Group objects. The application-specific Application Program Interface (API) and application-specific shim components of this DirXML driver run on NetWare 5 with Support Pack 4 or above and Windows 2000. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/activedir/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/activedir/pricing.html).)

**Note.** DirXML drivers have three components: an application-specific API, an application-specific shim, and eXtensible Markup Language (XML) and eXtensible Style Sheet Language Transformation (XSLT) documents that comprise the rules, filters, and data transformations on drivers' Subscriber and Publisher Channels. You import these XML and XSLT documents into eDirectory 8.7, which runs on NetWare 5 with Support Pack 4 and above, AIX, Linux, Solaris, Windows 2000, and Windows NT.

- **DirXML Driver 1.1a for Delimited Text 1.0.** Using this DirXML driver, you can synchronize data between eDirectory and applications that are capable of exporting data to a file. By default, this driver supports data exchanges via both its Subscriber and Publisher Channel. You can configure the Subscriber Channel to receive information from text files and push this information to eDirectory. Conversely, you can configure the Publisher Channel to push information from eDirectory to a text file.

By default, the DirXML Driver for Delimited Text supports two file formats: Comma Separated Value (CSV) and XML. However, you can create XSLT documents that can use data from any delimited file format. This DirXML driver runs on NetWare 5 with Support Pack 4 and above, AIX, Linux, Solaris, Windows 2000, and Windows NT. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/delimited/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/delimited/pricing.html).)

- **DirXML Driver 1.5a for Exchange.** You can configure this DirXML driver to synchronize information between eDirectory User and Group objects and Microsoft Exchange 5.5 mailboxes and distribution lists. Application-specific components of this DirXML driver run on any platform upon which eDirectory runs. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/exchange/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/exchange/pricing.html).)
- **DirXML Driver 1.5a for LDAP.** You configure this DirXML driver to synchronize information between eDirectory and one of the following Lightweight Directory Access Protocol (LDAP)-compliant directories: Sun Open Net Environment Directory (Sun ONE), IBM Secure Way Directory, Innosoft Directory Services, and Critical Path InJoin Directory. This DirXML driver

runs on NetWare 5 with Support Pack 4 and above, AIX, Linux, Solaris, Windows 2000, and Windows NT. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/ldap/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/ldap/pricing.html).)

- **DirXML Driver 1.1a for eDirectory.** You configure this driver to synchronize information between two eDirectory 8.62 and above trees. (The DirXML Driver for eDirectory must be running on both trees.) This driver supports NetWare 5 with Service Pack 4 and above, AIX, Linux, Solaris, Windows 2000, and Windows NT. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/nds/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/nds/pricing.html).)
- **DirXML Driver for GroupWise 1.0a.** You can configure this DirXML driver to synchronize information between eDirectory and the GroupWise domain database. You can also configure this DirXML driver to automatically create, update, and disable user accounts in GroupWise. The DirXML Driver for GroupWise supports GroupWise 5.5, GroupWise 5.5 Enhancement Pack, and GroupWise 6. Application-specific components of this DirXML driver run on Windows XP, 2000 Professional Edition, and NT with Service Pack 5. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/groupwise/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/groupwise/pricing.html).)
- **DirXML Driver 1.5a for Lotus Notes.** You can configure this DirXML driver to synchronize information in eDirectory with information in any version of the Lotus Notes R5 database. You can also configure this DirXML driver to create registered users in the Notes Address Book. This DirXML driver runs on NetWare 5 with Support Pack 4 and above, AIX, Linux, Solaris, Windows 2000, and Windows NT. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/notes/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/notes/pricing.html).)
- **DirXML Driver 1.3a for NT Domain.** You can configure this DirXML driver to synchronize information in eDirectory 8.7 with Windows domain User and Group objects. The application-specific components of this DirXML driver run only on Windows NT. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/nt/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/nt/pricing.html).)
- **DirXML Driver 1.6 for JDBC.** You can configure this DirXML driver to synchronize information between eDirectory and the following Java Database Connectivity (JDBC)-accessible relational databases: DB2 Universal Database (UDB) 7.x, Informix Dynamic Server 9.x, Sybase Adaptive Server 12.x, Microsoft SQL Server 7.x, and Oracle 8.x.

This DirXML driver supports JDBC 1.0 character, numeric, and time data types. Application-specific components of the DirXML Driver for JDBC run on NetWare 5 with Support Pack 4 and above, AIX, Linux, Solaris, and Windows NT. (For information about pricing, visit [www.novell.com/products/edirectory/dirxml/drivers/jdbc/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/jdbc/pricing.html).)

- **DirXML Driver 3.6a and 4.0 for PeopleSoft.** You configure this DirXML driver to synchronize information in the PeopleSoft database with User and Group information in eDirectory. Application-specific components of this DirXML driver run on NetWare 5 with Support Pack 4 and above, AIX, Linux, Solaris, Windows 2000, and Windows NT. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/peoplesoft36/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/peoplesoft36/pricing.html).)

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- **DirXML Driver 1.0a for SAP HR.** You configure this DirXML driver to synchronize information in the SAP HR database with User and Group information in eDirectory. Application-specific components of this DirXML driver run on the same platforms on which eDirectory runs. (For pricing information, visit [www.novell.com/products/edirectory/dirxml/drivers/saphr/pricing.html](http://www.novell.com/products/edirectory/dirxml/drivers/saphr/pricing.html).)
- **DirXML Driver 1.0 for IBM MQ Series.** You configure this driver to synchronize information between business processes

that are integrated using IBM MQ Series and eDirectory, thereby directory-enabling these processes. The DirXML Driver for IBM MQ Series application-specific components run on NetWare 6, IBM AIX, AS/400, HP-UX 10-20, HP-UX 11, Linux for Intel, Linux for S/390, Solaris, Windows 2000, and Windows NT.

You can also develop custom DirXML drivers using DirXML Driver Kits for Linux, NetWare and NT, and Solaris. (You can download these DirXML Driver Kits from <http://developer.novell.com/ndk/downloadaz.htm>.)

new user accounts in Active Directory and Exchange. DirXML uses processes similar to the process outlined above to create these accounts, applying the rules and filters associated with the Subscriber Channels for these systems' drivers.

When the Exchange driver creates a new account lkennard, Exchange creates an e-mail address for this user. The Exchange event system passes news of this transaction to the Exchange driver's Publisher Channel.

The Exchange driver's Publisher Channel creates an XML document based on this information and passes this document to the DirXML engine. The DirXML engine then uses the preconfigured rules, filters, and transformations on the Exchange driver's Publisher Channel to update lkennard's e-mail address in the Workforce Tree.

When lkennard's e-mail address is updated in the Workforce Tree, the PeopleSoft and Active Directory drivers' Subscriber Channels take note of this event, create XML documents, and pass the documents to the DirXML engine. The DirXML engine, again using the rules and filters associated with these drivers' Subscriber Channels, pushes information regarding lkennard's e-mail address through to PeopleSoft and Active Directory.

#### Inactivate or Disable Accounts

If you disable the lkennard record in PeopleSoft, DirXML uses a process similar to the process it uses to create a user account. The difference, of course, is that the rules associated with a disabled PeopleSoft account would trigger processes that would result in DirXML moving the lkennard User object in the Workforce Tree from the Users Active container to the Inactive container.

Moving the lkennard User object from the Active to the Inactive container triggers processes that result in Dir-

XML disabling accounts for Linda Kennard in Exchange and Active Directory.

#### WHAT NEXT?

This is what Nsure Resources is really all about: providing you with everything you need out of the box to get a generic provisioning system running in your lab very quickly, so you can begin immediately to test its default configurations. After testing the default configuration for Nsure Resources, you can begin to take steps toward implementing a customized provisioning system on your live network.

Of these steps—the steps that will take you out of the lab to your live network—Nsure Resources marks the beginning and can serve as a prototype for the provisioning system you deploy on your live system. These steps require, among other things, a thorough understanding of your company's business processes, expertise in XML and XSLT, and a great deal of additional testing. (For basic information on the types of work required to customize Nsure Resources, bring it out of the lab, and set it up on to your live network, see "Novell Nsure Resources: The Road From Lab to Live" on p. 20.)

#### In the Long Run

Although the easiest to quantify, short-term benefits are not the only benefits of a system that provisions access to network resources. Over the long term, such systems, which are commonly called employee provisioning systems, save companies money by improving security. Such systems simplify the process of preventing former employees from accessing network resources and thus minimize the risk that these employees' accounts will not be deleted or will not be deleted quickly enough to prevent security breaches.

As one of several products in Novell's SIM solution, Nsure Resources marks the beginning of the road to implementing a system for securely managing user identity information. The beginning Nsure Resources offers comes in the form of an example system that automatically provisions access to network resources.

In effect, the example that Nsure Resources provides is similar to the first problem on a math sheet that's been done for you: Although you still have to solve the problems that haven't been done, you can study the example of the completed problem to gain a sense of how to approach solving the remaining problems. Similarly, when you see Nsure Resources' preconfigured design for a provisioning system in action, you will be better able to determine how you want to customize this system to automate your company's processes for managing user identity information.

The bottom line is that Nsure Resources, out of the box, provides a generic provisioning system that jumpstarts the process of implementing a customized provisioning system.

*Linda Kennard works for Niche Associates, which is located in Sandy, Utah.*

Few companies realize how vulnerable they are in this respect, Burton Group analyst Kevin Kampman says. (Burton Group is an IT research, consulting, and advisory firm. For more information, visit [www.burtongroup.com](http://www.burtongroup.com).) Kampman adds that calculating the amount of money companies potentially save by improving security in this area is difficult at best because security threats are intangible by nature. Nevertheless, Kampman believes that improving security with a provisioning system "represents as significant a return on investment over time" as short-term gains afforded by such a system.



# Novell Nsure Resources

by Linda Kennard

The Road From  
Lab to Live

**a**s explained in the article titled "Provisioning Access to Network Assets: Get a Jump Start With Novell Nsure Resources," Novell Nsure Resources enables you to set up in your lab a generic system that provisions access to network resources. (See p. 6.) Such a system, commonly called an *employee provisioning system*, automates the processes of creating, modifying, and deleting user identity information across multiple systems.

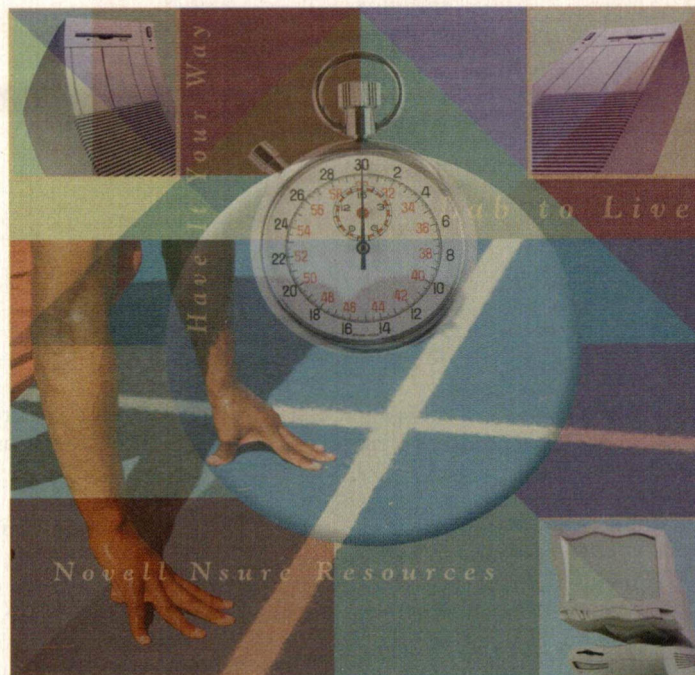
One of several products in Novell's secure identity management (SIM) solution, Nsure Resources' generic employee provisioning system is based on preconfigured DirXML 1.1a components. These components include DirXML drivers for several popular human resource, messaging, and account and NOS directories, namely the following:

- PeopleSoft (PeopleTools 7.5x and 8.1x)
- SAP HR 4.6c or above
- Microsoft Exchange 5.5
- Active Directory with Exchange 2000
- Novell GroupWise 5.5, 6.0, and 6.1
- Lotus Notes R5
- Novell eDirectory 8.62 and 8.7
- Microsoft Active Directory
- Microsoft NT 4

The generic Nsure Resources system you set up in your lab automates the creation, modification, and deletion of user account information across the systems you include in your Nsure Resources setup. Nsure Resources enables you to choose the following number and types of systems in your lab configuration:

- One human resource system (PeopleSoft or SAP)
- One messaging system (GroupWise, Exchange, or Lotus Notes)
- One to three account and NOS directories (eDirectory, Active Directory, and Windows NT 4)

The drivers for these systems include, among other things, preconfigured rules and filters that enforce Nsure Resources' generic policies. These rules and filters are represented in eXtensible Markup Language (XML) and eXtensible Style Sheet Language Transformation (XSLT) documents. DirXML consults these documents to broker the exchange of information between the systems in your Nsure Resources setup. The rules and filters



reflected in these documents basically control the order in which events occur on your systems, the types of events that occur on each system, and the way these events occur.

You can have this generic provisioning system up and running in your lab within only days. Nsure Resources thus acts as a sort of catalyst to launch your company's efforts to implement a live provisioning system.

## PHASING TO LIVE

Of course, transforming the generic provisioning system you create using Nsure Resources into a customized version of this system ideally suited for your live network can be a difficult process. Among other things, this process requires a thorough understanding of your company's business policies and the expertise to translate these policies into XML and XSLT documents.

Getting your generic system out of the lab and on to your live network requires the following phases:

- **Phase 1.** Analyze your company's rules and processes associated with managing the user accounts Nsure Resources will provision
- **Phase 2.** Customize the default configurations for Nsure Resources to automate the processes you pinpoint during Phase 1 and then test your customized system
- **Phase 3.** Install Nsure Resources on your live network and import your customized drivers

Of course, as Jack Mullins, Novell provisioning solution line manager, points out, summarizing the phases involved in getting a provisioning system out of the lab and onto your live network risks understating the potential difficulty of these phases. To be fair, details regarding the work involved in completing these phases require more explanation than I can offer here in the space of a few pages.

However, I can at least provide you with a general picture of what these phases involve. In the process, I can also show you one



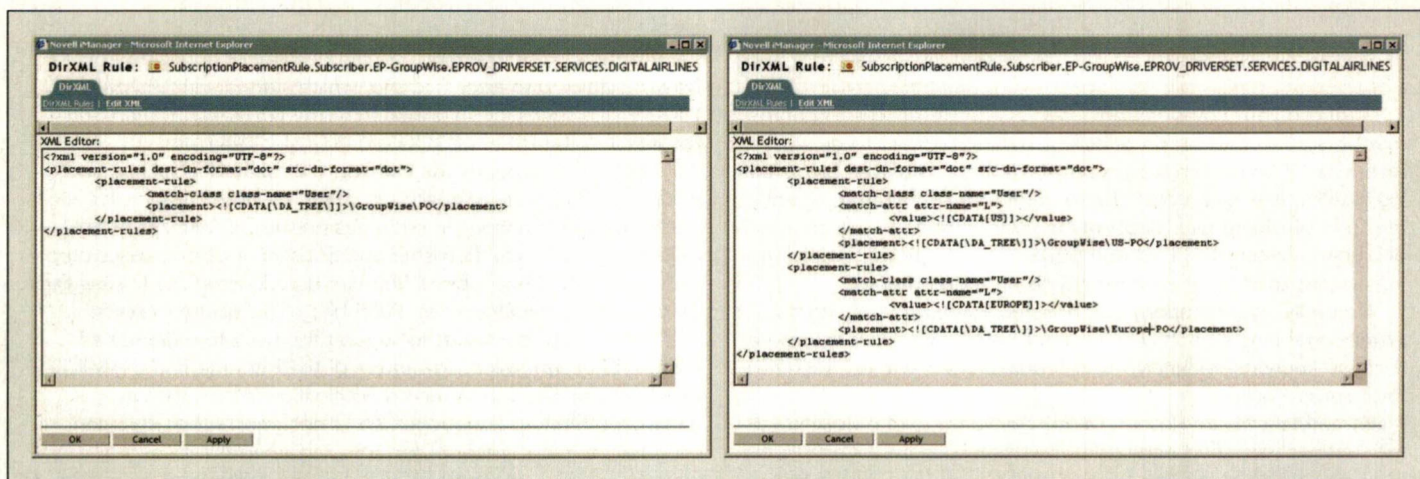


**Figure 1.** Customizing Nsure Resources requires the expertise to translate your company's policies into eXtensible Markup Language (XML) and eXtensible Style Sheet Transformation Language (XSLT) documents. In this example, the Nsure Resources default Placement rule for GroupWise, shown in the XML document on the left, has been customized to reflect a new Placement rule, shown in the XML document on the right. The new Placement rule determines post office placement based on whether users are in the US\_Users or Europe\_Users container.

example (admittedly a simple one) of how to modify one of Nsure Resources' generic XML documents to reflect a different policy. (This article requires a baseline understanding of Nsure Resources and assumes that you have read "Provisioning Access to Network Assets: Get a Jump Start With Novell Nsure Resources" on p. 6.)

#### WHAT'S YOUR ANALYSIS?

To begin the work of moving an employee provisioning system from the lab to a live network environment, you need a thorough understanding of your company's business policies for managing user-identity information. In all likelihood, most of Nsure Resources' default policies will not match exactly the policies in place at your company. For example, what's your company's policy for dealing with the accounts of terminated employees? Which systems in your company are considered the authoritative sources for what information? (For information on Nsure Resources' default policies, see the "Policies in Action" section on p. 13 in the article "Provisioning Access to Network Assets: Get a Jump Start With Novell Nsure Resources.")

These examples are admittedly simple. In fact, the policies underlying user-identity management can be very complex (particularly in large organizations). Consequently, analyzing your company's business policies can be among the most difficult phases involved in customizing a generic system based on Nsure Resources. For example, if you're in the healthcare industry, you face the Herculean task of

understanding the policies and processes currently in place to comply with the Health Insurance Portability and Accountability Act of 1996 (HIPAA).

Because performing an in-depth analysis of existing policies can be complex and time-consuming, your company may benefit from outside expertise to complete this phase. Employing the aid of a Novell value added reseller (VAR), systems integrator, or consulting organization can decrease the amount of time it takes to analyze your company's existing policies. This, in turn, decreases the amount of time it takes to launch an Nsure Resources' provisioning system on your live network and begin reaping a return on the investment.

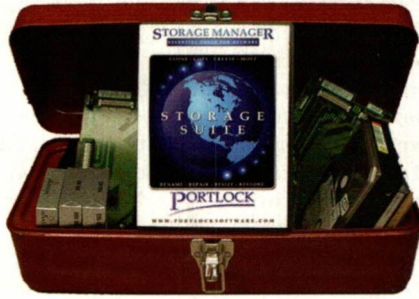
A VAR, systems integrator, or consulting organization also can help your company identify inefficiencies in and problems with existing policies and processes. Your company thus can avoid automating these problem policies and processes.

In addition, a VAR, systems integrator, or consulting organization can help your company develop a long-term strategy for provisioning more policies and processes using the DirXML infrastructure upon which Nsure Resources is based. (For information about systems integrators and consulting companies that can help you set up an employee provisioning system, see "A Helping Hand" on p. 24. For a list of third-party companies that have products that support Novell Secure Identity Management solutions, see "Working Together" on p. 25.)

#### HAVE IT YOUR WAY

After you have a clear understanding of your company's business policies, you can begin the next phase: Customizing Nsure Resources to reflect and automate

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## Reporting and Notification

Suppose your company has used Nsure Resources to implement a system that automatically provisions access to network resources. This system, commonly called an *employee provisioning system*, has taken over the manual task of creating, updating, and disabling user accounts in your company's critical applications, directories, and databases. This employee provisioning system saves your company both time and money.

Naturally, your company has a vested interest in keeping this system operating smoothly. One step toward doing so is to ensure that you know immediately when certain crucial events—such as fatal errors—occur.

Fortunately, Nsure Resources takes advantage of a new Novell eDirectory service that can notify you when such events occur: the Reporting and Notification Service (RNS) 1.00. The RNS is also available with DirXML 1.1a, the latest version of DirXML and the version upon which Nsure Resources is based.

Using plug-ins for Novell iManager, you can configure RNS to notify you when any or all of the following events occur within your company's DirXML (or, in this case, Nsure Resources) system: fatal errors, errors, warnings, retries, and successes.

The RNS also records information about where these events occur and which eDirectory objects are affected by these events. (DirXML uses eDirectory as a central repository for user and DirXML information.) For example, RNS may record that an error occurred on a particular driver's Subscriber or Publisher Channel.

The RNS is the latest in a continuous line of improvements to DirXML status and error tracking, which started with DirXML 1.0. DirXML 1.0 sends log information to the DSTRACE screen and records it in the DIRXML.LOG or DSTRACE.LOG files.

DirXML 1.1 supports the DirXML 1.0 method for status and error tracking but also supports another method: DirXML 1.1 records event notifications in attributes on the DirXML Driver Set objects as well as the Publisher and Subscriber objects associated with a DirXML Driver object. You can use ConsoleOne to view the Status Log for the Driver Set, Publisher, or Subscriber objects.

DirXML 1.1a continues to support the two aforementioned methods but now takes advantage of the RNS method as well. The RNS enables you to record notification information in eXtensible Markup Language (XML) documents that RNS can send to you in a number of formats, including the following: a log file, an e-mail message, an LDAP directory entry, and a directory services event.

You can read the log files directly, or you can configure third-party reporting tools to process the information in the log files. For example, you can configure Crystal Decisions Crystal Reports to use information in an XML file to generate formatted reports. (For detailed information about how to configure Crystal Reports to use an RNS XML file, see "DirXML and the Reporting & Notification Service (RNS)," *Novell AppNotes*, Aug. 2002. You can download this article from <http://developer.novell.com/research>. For more information about Crystal Reports, visit [www.crystaldecisions.com](http://www.crystaldecisions.com).)

your company's policies.

A very early part of this customization phase is to add drivers to your initial lab setup to better mirror your live network. That is, in the initial configuration of Nsure Resources, you select one human resource system, one messaging system, and one to three account systems. However, you are not restricted to this handful of systems. You can later add drivers and even multiple instances of drivers to meet your business needs.

For example, perhaps you have more than one human resource system, each of which is the authoritative source for the data it maintains. Perhaps you have more than one messaging system and assign particular groups of users to these different systems. One group may use Lotus Notes while another group uses GroupWise. You may give some network users only a Windows NT 4 account and give other users both a Windows NT 4 account and an Active Directory account.

Whatever your specific case, Nsure Resources provides a starting point to enable you to get a sample provisioning system running quickly in your lab. The big effort is revamping this sample system to match your network environment.

The configuration phase, like the analysis phase, is time-consuming. Taking what you have working in your lab and making it work in your live environment is not as simple as moving what you've got. You might have a complex infrastructure in your network environment that simply does not match the simple configuration in your lab. For example, you might have multiple messaging systems, or you might have to move from the single-server environment in your lab to a multiple-server environment on your live network.

Whether or not your lab configuration closely matches your live configuration, customizing Nsure Resources at the very least puts you face-to-face with the task of translating your company's policies into XML and XSLT documents. Doing so requires expertise in XML and XSLT. If you do not have such expertise in-house, you will need the assistance of a Novell VAR, systems integrator, or consulting organization.

Even if you do have in-house XML and XSLT experts, seeking the aid of these outside specialists might still save you time (and money). For example, members of the Novell Consulting team

regularly customize DirXML drivers and, consequently, know the process quite well. Mullins says that members of the Novell Consulting team typically require only days to complete a job. Depending on your level of expertise, this same job could take weeks to months.

At any rate and at the very least, as part of this phase, you customize Nsure Resources' preconfigured drivers to reflect your company's business policies. To give you an idea of how you customize Nsure Resources' drivers, consider the following example.

Suppose you work for a multinational company that has two GroupWise post offices: one post office for employees working in the U.S. and a second post office for employees working in Europe. Further suppose that in your Workforce Tree, you have created two User containers: US\_Users and Europe\_Users.

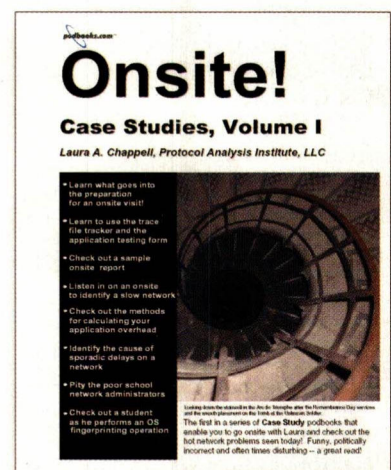
In Nsure Resources, the default Placement rule associated with the GroupWise driver's Subscriber Channel places all GroupWise users in the same post office. However, the Placement rule can be modified to base post office placement on an attribute value or the eDirectory User container.



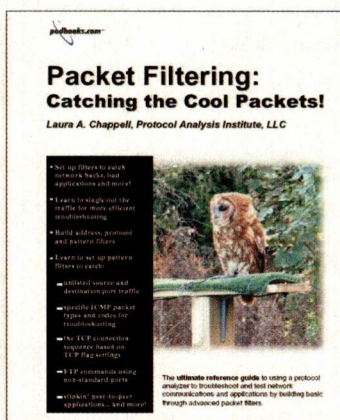
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## A Helping Hand

The following integration and consulting companies can help you plan, create, and set up Novell Secure Identity Management (SIM) solutions for your company. (For more information about SIM solutions, visit [www.novell.com/news/leadstories/2002/oct16](http://www.novell.com/news/leadstories/2002/oct16).) Some of the companies listed are international companies, and others are national or regional companies. The international companies are listed first.

### COMPANY

Bearing Point  
Cap Gemini Ernst & Young (CGE&Y)  
Computer Sciences Corp. (CSC)  
Deloitte & Touche  
PricewaterhouseCoopers

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Alphanumeric  
CenterLogic  
Compuquip Technologies  
DataTechnique Inc.  
DSI Consulting Inc.

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Jaguar Computer Systems Inc.  
DynTek

Entré Network Consulting Services  
Integrated Network Systems LLC  
Sparkhound  
Maintech  
Network Business Systems  
Networks Inc.  
Novacoast Inc.  
Gracon Services Inc.  
AimNet Solutions  
Netivity Solutions  
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Attronica Computers Inc.  
RDA Enterprises Inc.  
Strategic Network Consulting  
SoftDev Inc.  
Stratasys Group LLC  
Technology Integration Group  
The Wiring Company  
G+H Netzwerk Design GmbH  
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New Jersey, California  
Alaska  
Hawaii  
California  
Michigan  
Connecticut, Massachusetts, New York, and Florida  
Massachusetts  
Michigan  
Virginia, Maryland  
New York, California, Florida, Bucharest  
Texas  
Florida  
Florida  
California  
North America, Europe, Japan, Australasia  
Offenbach, Germany  
Wiesbaden, Germany  
Berlin, Germany  
Netherlands  
Netherlands  
Netherlands  
France  
Sweden  
Sweden  
Sweden



In this case, you decide to modify the default Placement rule to determine post office placement based on the user's container. As you can guess, you want this rule to use this logic: If the user is in the US\_Users container, place this user in the US GroupWise post office; if the user is in the Europe\_Users container, place this user in the Europe GroupWise post office.

To modify the Placement rule to match your company's placement policy, you decide to use iManager, which you launch to browse for the GroupWise driver's Subscriber object. When you locate the Subscriber object (located in the GroupWise Driver object), you select this object's Placement Rule and click Edit XML.

iManager then displays an XML document that comprises the Placement rule on the GroupWise driver's Subscriber Channel. (See Figure 1 on p. 21.) You modify this XML document, changing the default Placement rule to match your company's GroupWise post office placement policy. (See Figure 1. Also, Novell's user documentation for DirXML 1.1a drivers includes detailed information about modifying rules and filters. For example, see "Novell DirXML Driver for GroupWise" at [www.novell.com/documentation/lg/dirxml11](http://www.novell.com/documentation/lg/dirxml11).)

During this customization phase, you test your system as it evolves. Predicting how long the customization and testing-to-perfection phase will last is nearly impossible. You test until you're certain that the system is perfect and ready for your live environment.

## ALL SYSTEMS GO

After you have vested the time and effort required to reach this point, you are ready to begin the final phase in the process of transforming a generic provisioning system suitable for a lab into a customized system suitable for your live network. The final phase is to install Nsure Resources on your company's live network.

You install Nsure Resources on your live network by repeating part of the installation procedure you followed to install Nsure Resources in your lab: You install eDirectory and create a provisioning tree, install DirXML components, install Novell iManager and Novell eGuide, and import your customized drivers. As you did during the lab installation, you use web-based

## Working Together

In today's world, companies can never be too rich or too secure. Forget about being thin. Whatever your company does, whatever software you add to the network, you must ensure that only legitimate users access the network. After those users have access to the network, you must ensure that they can easily access the resources they need—but only those resources.

Novell's Secure Identity Management (SIM) solutions can help you secure your network and enable your company's users to access the resources they need. The following Novell partners provide products that support Novell's SIM solutions:

|                              |                                                                        |
|------------------------------|------------------------------------------------------------------------|
| PeopleSoft                   | <a href="http://www.peoplesoft.com">www.peoplesoft.com</a>             |
| SAP                          | <a href="http://www.sap.com">www.sap.com</a>                           |
| Siebel Systems Inc.          | <a href="http://www.siebel.com">www.siebel.com</a>                     |
| Tibco Software Inc.          | <a href="http://www.tibco.com">www.tibco.com</a>                       |
| Yahoo! Inc.                  | <a href="http://www.yahoo.com">www.yahoo.com</a>                       |
| Hewlett-Packard              | <a href="http://www.hp.com">www.hp.com</a>                             |
| IBM                          | <a href="http://www.ibm.com">www.ibm.com</a>                           |
| Bea Systems Inc.             | <a href="http://www.bea.com">www.bea.com</a>                           |
| NetVision Inc.               | <a href="http://www.netvision.com">www.netvision.com</a>               |
| Metastorm Inc.               | <a href="http://www.metastorm.com">www.metastorm.com</a>               |
| Protocom Development Systems | <a href="http://www.serversystems.com">www.serversystems.com</a>       |
| RF Ideas Inc.                | <a href="http://www.pcprox.com">www.pcprox.com</a>                     |
| ActivCard                    | <a href="http://www.activcard.com">www.activcard.com</a>               |
| Arcot Systems Inc.           | <a href="http://www.arcot.com">www.arcot.com</a>                       |
| BioID                        | <a href="http://www.bioid.com">www.bioid.com</a>                       |
| Biometric Access Corp.       | <a href="http://www.biometricaccess.com">www.biometricaccess.com</a>   |
| BioPassword                  | <a href="http://www.biopassword.com">www.biopassword.com</a>           |
| Identix                      | <a href="http://www.identix.com">www.identix.com</a>                   |
| Saflink Corp.                | <a href="http://www.saflink.com">www.saflink.com</a>                   |
| SecuGen Biometric Solutions  | <a href="http://www.secugen.com">www.secugen.com</a>                   |
| Secure Computing             | <a href="http://www.securecomputing.com">www.securecomputing.com</a>   |
| VASCO                        | <a href="http://www.vasco.com">www.vasco.com</a>                       |
| Veridicom Inc.               | <a href="http://www.veridicom.com">www.veridicom.com</a>               |
| VisionSphere Technologies    | <a href="http://www.visionspheretech.com">www.visionspheretech.com</a> |

wizards in iManager to import your drivers. This time, however, you use the wizards to export the drivers from your customized Nsure Resources environment and import them into your production environment.

Using ConsoleOne or Novell iManager, you then activate these drivers. You activate and license each driver separately within 90 days of installation. (For more information, see "Activating Your DirXML Product" in the DirXML Administration Guide. You can find this document at [www.novell.com/documentation](http://www.novell.com/documentation).)

When Nsure Resources is running on your live network, you'll want to check out additional tools, such as the Reporting and Notification tool, that help keep your provisioning system running smoothly. (For more information, see "Reporting and Notification" on p. 22.)

## IS IT WORTH THE TIME AND EFFORT?

With Nsure Resources, Novell provides you with a generic employee provisioning system that you can have running in your lab within only days. This generic system can thus jump-start the long process of implementing a customized version of such a system on your live network.

That said, customizing and reconfiguring your generic Nsure Resources lab setup to prepare it for your production network can take a considerable amount of time and effort. Is it worth it? Burton Group analyst Kevin Kampman thinks so. Kampman, like other analysts, believes that a significant number of companies will implement an employee provisioning system sooner or later because the rewards of doing so far outweigh the risks. What do you think?

Linda Kennard works for Niche Associates, which is located in Sandy, Utah. ●



## NOVELL CERTIFIED PROFESSIONAL

Edward Falzon and Brad Anderson

# The Dynamic Trio

## ZENworks for Desktops, ZENworks for Servers, and ZENith

*Editor's Note: This article assumes that you have a basic understanding of ZENworks for Desktops and ZENworks for Servers. For more information about these products, visit [www.novell.com/products/zenworks/desktops](http://www.novell.com/products/zenworks/desktops) and [www.novell.com/products/zenworks/servers](http://www.novell.com/products/zenworks/servers).*

**M**anaging desktops across multiple sites requires a desktop management solution such as Novell's ZENworks for Desktops. With centralized application management, workstation management, inventory, imaging, remote control, and a host of other features, ZENworks for Desktops is a "must-have" for the enterprise.

However, with new ZENworks for Desktops applications requiring deployment every week or with patches needing to be sent out to scores of locations, you probably need additional help. ZENworks for Servers steps up to the plate and easily manages the .FIL file deployment, with automatic scheduled updates to Application objects across multiple trees.

If you are using either or both of these products, you may already know about a third product that helps you automate desktop management even more. For example, how would you like the ability to manage changes to applications that don't affect every site? How would you like to automatically reconfigure macro values to reflect each container's needs? Would you like to have a fully documented history of each application's deployment?

ZENith from Performing PC's works with ZENworks for Desktops and ZENworks for Servers. With its patent-pending Relative Association and Relative Macros technologies, ZENith enables you to automatically document application deployments, search and replace applications, manage Globally Unique Identifiers (GUIDs), and more.

Because you probably already know how to manage a simple ZENworks environment, this article focuses instead on the

challenge of managing a multitree, multisite environment. In particular, this article explains how you can use ZENworks for Desktops, ZENworks for Servers, and ZENith together to meet this challenge.

### THE ENVIRONMENT

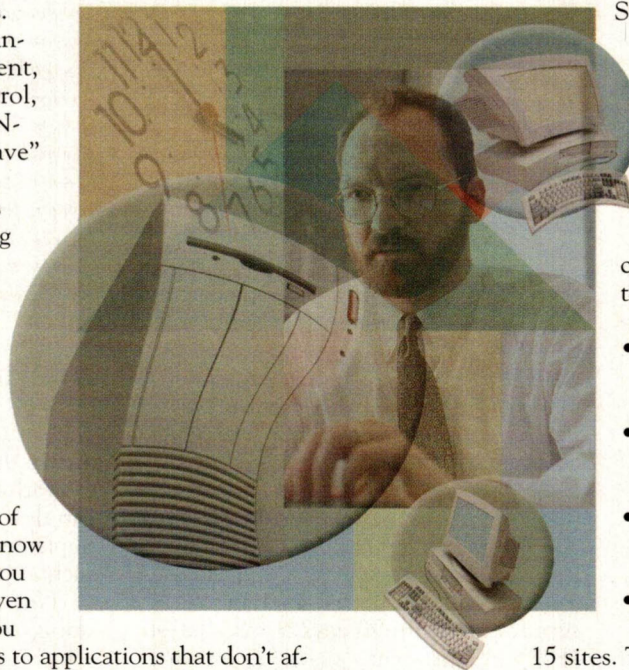
The best way to demonstrate how these three products—ZENworks for Desktops, ZENworks for Servers, and ZENith—can help you manage a multisite environment is by using an example. This example is a blend of the environments of several joint Novell-Performing PC's customers—all of whom have experienced one or more of the problems outlined in this article.

As the network administrator of his company, Steve manages four directory trees, with the following configurations:

- Tree 1 includes NetWare 5.1, ZENworks for Desktops 4, and ZENworks for Servers 3 and spans 20 sites.
- Tree 2 includes NetWare 5.1, ZENworks for Desktops 4, and ZENworks for Servers 2 and spans 12 sites.
- Tree 3 includes NetWare 4.2, ZENworks for Desktops 3.2, and ZENworks for Servers 2 and spans 80 sites.
- Tree 4 includes NetWare 4.2 and ZENworks for Desktops 2 and spans 15 sites. Tree 4 does not include ZENworks for Servers.

Steve and his team manage a total of 4,000 workstations. Each site has one server (and, therefore, one server per container). The WAN links between all the sites are at least T1 lines, and the company is licensed to use ZENith on all Novell eDirectory trees. The desktop operating systems in use range from Windows 95 to Windows XP.

Across these trees are some 350 unique Application objects and 15 unique user/workstation policies. These applications and policies are distributed unevenly across the 127 sites.





In addition, Steve's team has a test lab with its own eDirectory tree. The lab has six PCs and servers and is reconfigured as necessary.

Steve's company is planning to merge the four production trees into one eDirectory tree with NetWare 6, ZENworks for Desktops 4, and ZENworks for Servers 3. The workstations will all be upgraded to Windows XP. For now, however, Steve has to manage the current environment.

### ZENWORKS FOR DESKTOPS

Suppose Steve has just received a directive from his boss to deploy a new version of QuickBooks, the company's accounting package. Because only the Accounting department uses QuickBooks, Steve has to copy the application to just three containers on Tree 2.

Steve creates the ZENworks Snapshot in the usual way and then imports the application template into the test lab. After the necessary testing and tweaking, Steve exports the Application object to the Application Object Template (AOT) format and imports it into the first container of Tree 2. He then uses the regular ZENworks for Desktops application copying process to copy the application to the other two containers, and he uses NCOPY to copy the 10 Mb of .FIL files to the three servers. Steve then associates the new Application object with the Accounting-Dept Group object, which exists in each of the three containers.

This process is reasonably straightforward, and Steve is done in approximately 20 minutes, not including the Snapshot process.

That afternoon, Steve's boss gives him a more involved task: The company has recently developed a Human Resource database with a simple front-end that allows employees to request annual leave, transfers, add/moves/changes, and so on. The new application has piloted successfully, so now Steve needs to deploy it to all users in Tree 1, which will serve as the first tree-wide deployment.

Because the new application was developed in-house, Steve can quickly create and test the ZENworks Snapshot and then copy the Application object into the first container in Tree 1. However, Steve's not keen to manually copy the Application object to 20 containers, and he's even less keen to copy the .FIL files to 20 servers.

### ZENWORKS FOR SERVERS

Because ZENworks for Servers 3 has been installed on Tree 1, Steve associates the Application object with the appropriate Group object in the first container. Steve then completes the following steps:

1. Using ZENworks for Servers, he runs the desktop application distribution wizard to create the Distribution object for the application.
2. He places the Distribution object in the appropriate application distribution channel.
3. He goes home early.

The Application object will be automatically copied to all 20 containers, and all the .FIL files will be copied to the 20 servers, too. Even better, the newly copied applications are also automatically associated with the same Group object at each location.

ZENworks for Servers' niceties don't stop there: When Steve alters the source Application object, all the now-linked Application objects are automatically updated on the next scheduled cycle.

How much time did Steve take to complete these tasks? With ZENworks for Desktops alone, Steve would have spent approximately four hours—if he was quick and didn't make any mistakes. Of course, that's a whole lot quicker than working without ZENworks for Desktops. With ZENworks for Servers, however, Steve spent a little over eight minutes.

### NOW FOR THE REALLY TOUGH STUFF

Now Steve has a rather severe problem: He needs to complete a task he was given a couple of days ago. He's been putting off this task because he knows it will take an enormous amount of time and energy to complete it properly. (As you read this section, you may get a headache just thinking about solving this problem.)

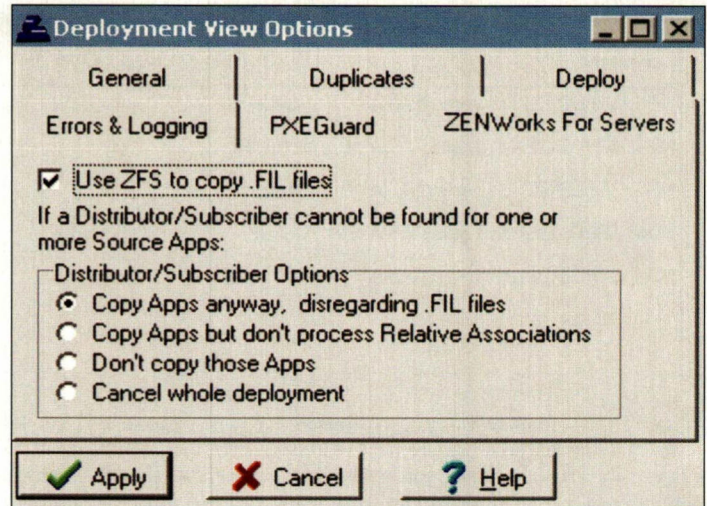


**Figure 1.** ZENith can dynamically configure ZENworks for Servers objects—including the Channel, Distribution, Distributor, and Subscriber objects—to copy the .FIL files. If you are using both ZENworks for Servers 2 and ZENworks for Servers 3, you need not worry: ZENith recognizes the differences between versions and configures each tree independently of each other.

Not surprisingly, Microsoft Word 98 is deployed at nearly every site on every tree. Unfortunately, a new security patch must be applied to every occurrence of the MS-Word-98 Application object. Steve's first thought is to merge the required changes into the existing MS-Word-98 Application object in Tree 1 and let ZENworks for Servers deploy the changes to the other containers.

However, that solution would work only on Tree 1. Not only must Steve deploy the patch to the other trees, but he also has another problem: Because the MS-Word-98 object is used by several networks and several types of PCs, the Application object's macro values differ between containers.

For example, at a couple of sites in Tree 4, the PC hard drives are partitioned. (Partitioning seemed like a good idea to Steve's predecessor.) As a result, the Program Files directory is on the D: drive, rather than on the C: drive. The DESTINATION\_PATH macro must be changed from C:\Program Files\MSOffice... to D:\Program Files\MSOffice...

Also, because of a few hard-coded in-house applications and no small amount of politics, the working directories are sometimes mapped to the K: drive and sometimes mapped to the M: drive. Steve will have to change the drive letter in the DOCUMENTS and WORKGROUP\_TEMPLATES macros.



| Containers                         | Z_SOURCE_SERV | Z_SOURCE_VOL | Z_DEST_DRV | Z_SOURCE_DRV | Z_SOURCE_PATH | GWSERV_IP     |
|------------------------------------|---------------|--------------|------------|--------------|---------------|---------------|
| NDS:\WPPCS\ZENith Testing\ASIA     | Handel        | nss_data     | C:         | F:           | apps\source   | 192.168.0.7   |
| NDS:\WPPCS\ZENith Testing\ASIA\MAL | Schubert      | Vol          | C:         | P:           | apps\source   | 10.10.10.181  |
| NDS:\WPPCS\ZENith Testing\ASIA\PHL | Strauss       | Vol          | D:         | L:           | apps\source   | 10.10.10.12   |
| NDS:\WPPCS\ZENith Testing\ASIA\SIN | Mozart        | nss_data     | C:         | F:           | apps\source   | 126.252.31.87 |
| NDS:\WPPCS\ZENith Testing\ASIA\THL | Bach          | nss_data     | D:         | E:           | apps\source   | 10.10.201.6   |

Commit Reload Export Macros >> Cancel Help

**Figure 2.** ZENith allows you to preconfigure unique macro values for an unlimited number of containers. After a macro name and value is configured for a given container, any application with a matching macro name that ZENith deploys to that container will automatically “inherit” that container’s unique macro value.

Steve takes an aspirin while he considers a couple of other issues: He can’t rely on the ZENworks for Servers Maintain Associations feature because although the MS-Word-98 object is consistently located in the ZEN subcontainer at each site, it’s usually associated with its grandparent container. For example, the Application object MS-Word-98.ZEN.LA.CA.Company is associated with all users in LA.CA.Company.

Other sites associate the application with Group objects in the grandparent container, rather than with the grandparent container itself. Using the Maintain Associations feature would remove the “uniqueness” of each site’s configuration.

After rolling out the new Application object (called the MS-Word-98-p3 object), Steve has to remove all associations from the old Application object. Otherwise, users will receive two MS-Word icons.

On top of these problems, Steve has to deploy MS-Word-98-p3 across four disparate trees that have different versions of ZENworks for Desktops and ZENworks for Servers.

Finally, the Application Folder object at each site is configured differently to accommodate the manner in which the employees at various sites like to work. The MS-Word-98 Application object may or may not appear in the same folder at each site in each tree.

Okay, take a deep breath, and let’s see how much work Steve has to do.

## ZENITH

After Steve creates the MS-Word-98-p3 Application object on his test tree,

he launches ZENith and performs the following steps:

1. He selects Upgrade View. This view provides an interface for Steve to “search & replace” applications.
2. Steve browses to his Test Lab tree and selects the application to be replaced. (He right-clicks the application and selects Upgrade | From this AO.)
3. He then selects the new application. (He right-clicks the application and selects Upgrade | To this AO.)
4. In the Options panel, Steve clicks Process Relative Macros. This option ensures that Steve’s macros will automatically reconfigure themselves, depending on which site the application is deployed to.
5. He selects Move Associations. With this option selected, ZENith examines the existing MS-Word-98 object in each site and performs a “cut & paste” of the associations into the new MS-Word-98-p3 object. ZENith will even move individual User object associations if they exist.
6. Steve selects Copy Linked Folder Associations. With this option selected, ZENith will copy the Linked Folder configuration from the existing MS-Word-98 object to the new MS-Word-98-p3 object. ZENith will copy the Linked Folder configuration on a site-by-site basis, so it doesn’t matter if the configuration is different between containers.
7. In the ZENworks for Servers tab, Steve clicks Use ZFS to Copy .FIL Files. With this option selected, ZENith will dy-

namically configure ZENworks for Servers objects—including the Channel, Distribution, Distributor and Subscriber objects—to copy the .FIL files. ZENith knows the difference between ZENworks for Servers 2 and ZENworks for Servers 3 and will configure each tree independently of the other. (See Figure 1 on p. 27.)

So far, Steve has made approximately 15 clicks in less than one minute of time. Unbelievable? Not really, when you consider that all of the above steps are performed on a single screen. You don’t have to use wizards, and you do little browsing.

Now Steve needs to specify the containers in which the existing MS-Word-98 objects are stored. Traditionally, Steve might browse to each container individually, but ZENith is designed for minimal clicking:

1. In the Tree Browse Window, Steve selects Tree 1.
2. Steve Ctrl-clicks the Organization object to add it to the Selected Branches window.
3. Steve repeats steps 1 and 2 for the other three trees.
4. Steve clicks the [Search] button in the middle of the screen. ZENith browses the specified Organization objects and creates a list (in the Selected Destinations window) of every container that includes the MS-Word-98 object.
5. The progress screen reports the status of the search and the amount of time the search ultimately takes. Steve clicks [Done] when he’s ready to proceed.



The configuration is completed, and all 127 sites are listed. At this point, Steve has made around 25 clicks in approximately 90 seconds.

Now Steve can check or reconfigure his Relative Macros settings by clicking Macros in the Selected Destinations window. In this spreadsheet view, which is shown in Figure 2, Steve can define macro names with unique values for each site. Each column represents a macro, and each row represents a container object.

As shown in Figure 2, Steve has already created a macro for the IP address of each GroupWise server (which is the far-right column). Steve has entered the unique IP address of the GroupWise server in each container, so whenever he uses ZENith to

*By adding ZENith to ZENworks, you can simplify management tasks even more. You can automate management tasks while still preserving the uniqueness of each installation or site.*

deploy an Application object that contains a macro called GWSERV\_IP, ZENith will automatically reconfigure the macro to the correct value, site by site.

In this case, no changes need to be made in the Relative Macros screen. Steve has to make just one more click before having morning tea: He clicks Upgrade.

## THE RESULT

While Steve does his happy dance (yes, Performing PC's does have a customer who recently reported that he literally does a "happy dance" each time he uses ZENith with ZENworks for Desktops), the ZEN Trio will perform the following at each container, entirely unassisted:

1. Copy the MS-Word-98-p3 Application object.
2. Copy the Linked Folder configuration from the MS-Word-98 object to the

MS-Word-98-p3 object.

3. Change the new application's macro values to reflect the uniqueness of each site.
4. Copy all .FIL files to the local server.
5. Confirm that the .FIL files are present before associating the new Application object with users.
6. Copy the Associations from the MS-Word-98 object to the MS-Word-98-p3 object.
7. Delete the Associations from the old MS-Word-98 object.
8. Document (in the Administrator Notes field) who set up this upgrade, when the upgrade was performed, and the name of the old Application object.
9. Document the old Application object to inform other network administrators that it has been superseded. (ZENith could just as easily delete the old Application object on-the-fly.)
10. If required, pause for other network traffic.
11. Retry processes that fail to complete (due to eDirectory delays or other issues).
12. Document any remaining problems.

## CONCLUSION

According to International Data Corp. (IDC), the ZENworks solution—the combination of ZENworks for Desktops and ZENworks for Servers—pays for itself in as little as three months because it simplifies management tasks and increases user productivity. (To read the complete IDC report, visit [www.novell.com/products/zenworks/idcwp.pdf](http://www.novell.com/products/zenworks/idcwp.pdf).)

By adding ZENith to ZENworks, you can simplify management tasks even more. You can automate management tasks while still preserving the uniqueness of each installation or site.

The three products complement each other to provide you with pain-free management of your desktop environment. For example, if you did not have ZENworks for Desktops, ZENworks for Servers, and ZENith to solve the nightmare problem outlined earlier in this article, you would probably require roughly 200 weeks to do the upgrade, if you used good scripting.

The bottom line is that using ZENworks for Desktops in the example environment decreases the costs and associated work by several orders of magnitude. Using ZENworks for Desktops and ZENworks for Servers introduces another significant decrease in administrative overhead. Adding

Performing PC's ZENith to the mix enables companies to automate all of the tasks and work to deploy updates in even the most complex environments.

In the scenario described in this article, using the combination of ZENworks for Desktops, ZENworks for Servers, and ZENith decreases the administrative requirements to literally five minutes or less, followed by a few hours of fully automated processing.

For more information about ZENworks for Desktops, visit [www.novell.com/products/zenworks/desktops](http://www.novell.com/products/zenworks/desktops). For more information about ZENworks for Servers, visit [www.novell.com/products/zenworks/servers](http://www.novell.com/products/zenworks/servers). For more information about ZENith, visit [www.performingpcs.com](http://www.performingpcs.com).

Edward Falzon is the founder and CEO of Performing PC's. He is also the creator and product manager for ZENith. He has consulted in the desktop-automation industry for 11 years.

Brad Anderson is the vice president of the ZENworks Management Services group at Novell. He was the first product manager of the ZENworks product line. ●


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